Award Nominee - NCHHSTP Atlas

URISA Exemplary Systems in Government (EISG) Award

NCHHSTP Atlas

With the NCHHSTP Atlas, you can:

- View national- and state-level surveillance data for HIV, AIDS, viral hepatitis, TB, and STDs, as well as county-level surveillance data for HIV and STDs.
- Query the data by demographic variables.
- View temporal data trends using the data player.
- Map, download, and export data and all graphics to share with colleagues or use in presentations or reports.

The NCHHSTP Atlas is an online, interactive mapping application that allows users to query HIV, AIDS, viral hepatitis, STD, and TB surveillance data. The Atlas allows users to observe trends and patterns by creating detailed reports, maps, and other graphics. Using the Atlas allows you to identify areas of the United States (and territories) that bear the greatest disease burden and to view epidemiologic data across our disease areas.

Check out the interactive NCHHSTP Atlas
www.cdc.gov/NCHHSTP/atlas
A. System
1. Name of system and category for which you are applying:
The National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention (NCHHSTP) Atlas; Single Process System

2. A letter from the executive administrator authorizing submission of the system application (letters must be signed and scanned). See letter from Gustavo Aquino at end.

3. One (1) page, or less, summary. See next page.

4. Three “user testimonials.” See testimonials at end.

B. Jurisdiction
1. Name of jurisdiction: United States and US Territories and Possessions

2. Population served by the organization/agency: State and local Health Departments, health care providers, and prevention partners in HIV, STD, viral hepatitis, and TB. The Atlas is also used by policymakers, the general public, and internal staff in HHS, CDC, and other government agencies.

3. Annual total budget for jurisdiction: 2014 Budget for atlas = $150,000

4. Name, title, and address of chief elected and/or appointed official:
Gustavo Aquino
Associate Director for Program Integration, NCHHSTP
8 Corporate Blvd., MS E07
Atlanta, GA 30329

5. Name, title, address, telephone, FAX, and email for contact person for system:
Kim Elmore
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The National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention’s (NCHHSTP) Atlas is an interactive application which allows the CDC to disseminate data, while allowing users to create maps, charts, and tables using HIV, viral hepatitis, STD, and TB surveillance data (www.cdc.gov/NCHHSTP/Atlas). Historically, each Division in NCHHSTP had separate websites the public could use to access surveillance reports, but there was no unified location. (NCHHSTP is comprised of the Division of HIV/AIDS Prevention [DHAP], the Division of Viral Hepatitis [DVH], the Division of STD Prevention [DSTDP], and the Division of Tuberculosis Elimination [DTBE].) The NCHHSTP Atlas was launched in early 2012 to better disseminate the Center’s surveillance data in a queryable, user-friendly format.

Some unique features of the atlas are: ability to query 14 disease variables, view state-level HIV, STD, TB, and hepatitis surveillance data; view county-level HIV and STD surveillance data; availability of >10 years of data, which allows for a ‘trend data player’ showing disease trends over time; ability to query by race/ethnicity, sex, and age group (also transmission category for HIV) and identify disparities; recommended queries with contextual narrative and links to CDC web sites for additional information; ability to toggle between rates or cases; ability to change map color and classification scheme (e.g., quartiles); option to export graphics to PDF and data to Excel; ability to zoom in/out on the map and pan; an interactive, sortable table; additional graphics that display national data; ability to compare selected state to national data (and county where available); and, an anonymous feedback button. The goal of this project is to widely disseminate NCHHSTP data to the public and our partners in public health.

The NCHHSTP Atlas supports the Data.gov initiative in that we make data more readily available to persons with access to the internet by providing a portal and enabling the public to easily access and process information that had been inaccessible before. This atlas also addresses the Healthy People 2010 Goals, specifically 23-3 “Increase the proportion of all major national, State, and local health data systems that use geocoding to promote nationwide use of GIS at all levels.” Public health rests on information. Increased use of geocoding in health data systems will provide the basis for more cost-effective disease surveillance and intervention. The capacity to achieve national goals is related to the ability to target strategies to geographic areas. The versatility of GIS supports the exploration of spatial relationships, patterns, and trends that otherwise would go unnoticed.

Over the course of 2 years, the atlas has had over 58,000 visits. The Atlas team feels we have successfully improved the way in which government operates, through the use of innovative geospatial information technology. In fact, we have been nominated for an HHS Innovates award.
C. System Design

1. What motivated the system development?

Prior to the Atlas development, there was no integrated data store or warehouse for HIV, Viral Hepatitis, STD, and TB data that could be used to meet the analytical and data dissemination needs of the Center. Limited data were available via CDC Wonder, but in a non-integrated fashion and without the appropriate level of cross-linking to Center web resources. NCHHSTP’s web sites provided static graphics via disease-specific annual surveillance publications. Those data sources were not adaptable or interactive or queryable. The Atlas standardizes the availability of the data in a novel approach that is not readily available anywhere else and the Atlas’ interactive capabilities have increased utility of these publicly available data.

2. What specific service or services was the system intended to improve?

Historically, each Division in NCHHSTP had separate web sites the public could use to access data, but there was no unified location. The NCHHSTP Atlas was launched in early 2012 to better disseminate the data. Users can create maps that display complex geographical data that affect public health risks, disease distribution, and disease burden in an easy-to-understand format. As the Atlas undergoes further development, the application will overlay other data sets that may bring a better understanding of the relationship of disease epidemiology to social determinants of health (e.g., poverty and disease prevalence). We have developed a tool aimed to disseminate surveillance data in a way that is easy to use and that uses the latest web-based technology for dynamic visualization. Geographic disparities may be easily identified in addition to disparities by age, race/ethnicity, and sex. Identifying the places that bear the greatest burden of disease allows for better understanding of disease concentration and is the first step to tailoring community resources, prevention efforts and other interventions where they are most needed.

3. What, if any, unexpected benefits did you achieve?

The CDC’s Division of Diabetes Translation’s atlas was inspired by, and uses much of the design and IT infrastructure originally developed for, the NCHHSTP Atlas. In addition, many areas within CDC have developed atlases in the past few years in order to better display and disseminate their data. There is a strong interest at CDC for all atlases to have a similar ‘look’ and design; the NCHHSTP Atlas leads the way in this effort.

4. What system design problems were encountered?

Our main design problem had to do with ‘data harmonization.’ Before development of the atlas began, we made a conscious decision to harmonize complex data where possible (age, race/ethnicity, and sex) from four different data collection systems, with complex data requirements. Not all data can be (or need to be) harmonized, but finding key common variables was vital to our success. Working with four divisions, there are preexisting confidentiality agreements between each division and their state and local partners which prevent the display
and stratification of certain data, as well as differing formats for age groups, race definitions, and population/denominator data! As we have learned, the harmonization of the data needs to be done very early on, ideally before development is started.

5. What differentiates this system from other similar systems?
The novelty of our application can be seen in a variety of ways. The NCHHSTP Atlas:
a. Enables the user to query 14 disease variables (other atlases either provide data on one disease or subcategories of that disease). (See F3 for a list of variables.)
b. Is the only location to view county-level HIV, gonorrhea, chlamydia, and syphilis surveillance data together.
c. Provides >10 years’ worth of data for HIV, STDs, TB, and viral hepatitis for most queries; in addition, this allows for a ‘trend data player’ that illustrates change over time.
d. Has the ability to query by race/ethnicity, sex, and age group (and transmission category for HIV data) and identify disparities.
e. All elements – the map, the data table and the additional graphics – are interactive.
f. As the user mouses over various components (e.g., classification schemes, estimated HIV diagnoses, etc), the application provides ‘roll-over help;’ i.e., a window pops up to provide a definition.
g. Gives the user the ability to toggle between displaying the data as rates or cases.
h. Allows the user the ability to compare a selected state to the national data, as well as a selected county to the state and national data, other applications do not have this ability.
i. Allows the user to choose their classification scheme, as well as the number of classes and the color ramp. In addition, AK, HI, DC, and the territories are effectively displayed.
j. Allows the user to select from a variety of color ramps for the maps, as well as data classification schemes for the maps (e.g., quartiles).
k. Allows the user to export the map and other graphics as a PDF or the option to export the data in excel format, many other applications do not.
l. Is built on GIS software, rather than Google Earth (allows for more emphasis on mapping, display & analyses);
m. Provides a set of recommended queries that include context as to why they are recommended as well as links to CDC web sites for additional information.
n. Has a full set of footnotes for each disease.
o. Has two mechanisms for the user to provide feedback and input - an anonymous feedback tool and an mailbox
D. Implementation

1. *What phases did you go through in developing the system?*

   We have gone through several development phases: Version 1, we launched the Atlas with state-level HIV and STD data in January 2012. Version 1.1, we added state-level TB and hepatitis data (July 2012). In September 2013, we added county-level HIV and STD data. In addition, at various times, we have updated our surveillance data. Throughout this time, we have conducted usability testing and promoted our product through the use of social media.

2. *Were there any modifications to the original system design? Why? What?*

   We have made many modifications in order to improve both performance and functionality. For example, with version 2.0, we updated the ‘compare’ function in order to make the window larger and the comparisons between nation-state-county more visible. In this same release, we added a ‘print’ button as well as an ‘additional resources’ section. The Atlas is currently undergoing additional development, including the adoption of different technology in order to create a mobile app. We’ve also had to modify our data usability and re-release agreements with state and local health departments. We plan to continue to review our re-release agreements in order to improve our data dissemination efforts.

E. Organizational Impact

1. *What user community does the system serve and how?*

   This integrated project serves a wide range of audiences, including policymakers, state and local prevention staff, the general public, and internal staff in HHS, CDC, and other government agencies so that they are able to create customized tables, maps, and other graphics of HIV, viral hepatitis, STD, and TB data. In addition to addressing programmatic needs and improving access to data, this project supports the current CDC priorities to strengthen surveillance and epidemiology, and it also strengthens our ability to support state and local public health efforts.

2. *What are the ultimate decisions/operations/services being affected? If appropriate, provide a few examples including, but not limited to: screen input/output forms, paper products, or other descriptive graphics.*

   The NCHHSTP atlas provides access to one single national data set for four disease areas, saving the government money from having to recreate a similar and separate tool for each disease area. It saves the Divisions money in that they have to respond to fewer individual data requests. It also saves state and local health department’s money, since they will not need to develop an individual state-based tool. Finally, many public health agencies (including CDC) have developed atlases in the past few years in order to better display and disseminate their data. An example of some new functionality is that the Atlas database is being used to generate the NCHHSTP state profiles; this process is now automated (in the past, each state’s profile was compiled manually). The Atlas has also allowed for the development of infrastructure that is reusable and shareable within CDC.
This screenshot is of our drop-down query menu:
This screenshot is of our current default query (where the user ‘lands’). You can see the buttons for the query (shown on previous screen shot) as well as other functionality mentioned in this document (e.g., the map display options, export options, anonymous feedback button, print button, footnotes & FAQ, play trend data button, ability to toggle between rate & cases [in legend], etc). What you cannot see in a static screen shot, is the interactivity between the map, table and bar graph – [www.cdc.gov/NCHHSTP/Atlas].
3. What were the quantitative and qualitative impacts of the system?

First of all, the NCHHSTP Atlas has served as a model for other CDC atlas’ that have been developed after seeing a demo (e.g., Division of Diabetes Translation’s atlas). In addition, as mentioned earlier, the NCHHSTP atlas provides access to one single national data set for four disease areas, saving the government money from having to recreate a similar and separate tool for each disease area. It saves the Divisions money in that they have to respond to fewer individual data requests. It also saves state and local health department’s money, since they will not need to develop an individual state-based tool.

Interest in the NCHHSTP Atlas has been demonstrated by the increasing number of users. From our original release date in February 2012 until our re-launch with county data on Sept 16 2013, we had over 46,000 visits, with a daily average of approximately 80. From the time we released county level data (Sept 17, 2013) until December 1, 2013, we had over 12,400 visits, with a daily average of approximately 160. In addition, CDC staff has received many positive emails about the Atlas. We have also been told via our anonymous feedback mechanism that the functionality of the NCHHSTP Atlas is outstanding and that the sophistication of the tool is above and beyond that of other similar applications (both inside and outside of the agency). In spite of this sophistication in functionality, however, the Atlas is consistently described as user-friendly and intuitive.

4. What effect has the system had on productivity?

So far this tool has fulfilled the needs of many researchers, students, and public health professionals that in the past would have needed to submit a data request. Therefore, there has been a decrease in the number of individual data requests that staff have to respond to. For the most part, staff can refer these requests to the atlas, which is a huge savings in staff time and energy. Anecdotally, we have heard from the surveillance branch chiefs that requests are down ‘significantly.’ (Unfortunately, we don’t have metrics for these data as the surveillance teams were not tracking the number of requests prior to the Atlas launch.)

5. What, if any, other impacts has the system had?

In addition to addressing programmatic needs and improving access to data, this project supports the current CDC priorities to strengthen surveillance and epidemiology, and it also strengthens our ability to support state and local public health efforts. This can be seen in a sample email from our anonymous feedback option: “This is amazing. I offer continuing education for mental health providers in HIV and this year I don't have to make any powerpoint slides. I am directly printing out y'all's pop up screens for my state. Powerful data that is easily accessible. It's like the holy grail of public health.”
6. How did the system change the way business is conducted with and/or service delivered to clients? Give specific examples comparing the old way with the new.

Again, this tool has fulfilled the needs of many researchers, students, and public health professionals that in the past would have needed to submit a data request (some of which may not have been filled). Therefore, there has been a decrease in the number of individual data requests that staff have to respond to. Internally, the process of developing this tool has helped each Division (which lead National Surveillance efforts across the country) think carefully about how the data are collected, stored and disseminated.
F. System Resources

1. What are the system’s primary hardware components? Give a brief list or description of the hardware configuration supporting the system.

The NCHHSTP Atlas is built using SQL Server, Web Server with IIS, and ArcGIS Map Server.

2. What are the system’s primary software components? Describe the primary software and, if a commercial package, any customizations required for the system.

The NCHHSTP Atlas primary software is Adobe Flex Builder, .NET, and WebOrb.

3. What data does the system work with? List and briefly describe the database(s).

The NCHHSTP Atlas currently uses surveillance data from the 4 divisions within the center—from DHAP: HIV diagnoses, persons living with HIV, HIV deaths, AIDS diagnoses, persons living with AIDS, and AIDS deaths; from DSTDP: gonorrhea, chlamydia, primary and secondary syphilis, early latent syphilis diagnoses; from DVH: acute viral hepatitis A, acute viral hepatitis B, and acute viral hepatitis C diagnoses; and from DTBE: TB diagnoses. These data are pre-suppressed by each division, according to the data release agreements with the states, and are then transferred into a dedicated SQL database.

4. What staff resources were required to implement the system? (i.e., report approximate staff and consultant time as FTE’s)

The NCHHSTP Atlas team is comprised of project managers, GIS architects, software developers, surveillance and epidemiology staff, QA testers, usability analysts, and graphic interface developers; this team is overseen by a Center-wide steering committee. Each member of this team is held in high regard as an outstanding leader and/or scientist in the fields of public health and data management, analysis, and visualization.

5. Comment on anything unusual about the resources used to develop your system, such as data, software, personnel and financing.

Our project is somewhat unusual at CDC in that all stages involve a cross-disciplinary team; SME in geography, epidemiology, web development, statistics, program, and more were involved. In addition, although the NCHHSTP Atlas is a NCHHSTP product, it is a project that crosses Divisions with the Center as well as other Centers within the CDC.
URISA
ESIG Award Coordinator
701 Lee St, Suite 680
Des Plaines, IL 60016

April 3, 2014

Re: Authorization for the submission of The NCHHSTP Atlas’ application for the URISA ESIG Award

I authorize the submission of The NCHHSTP Atlas for the URISA ESIG Award in the Single Process System Category for your consideration. The NCHHSTP Atlas supports the Data.gov initiative in that data is made more readily available to persons with access to the internet by providing a portal and enabling the public to easily access and process information that had been inaccessible before. This atlas also addresses the Healthy People 2010 Goals, specifically 23-3 “Increase the proportion of all major national, State, and local health data systems that use geocoding to promote nationwide use of GIS at all levels.” Public health rests on information. Increased use of geocoding in health data systems will provide the basis for more cost-effective disease surveillance and intervention. The capacity to achieve national goals rely on our ability to target strategies to geographic areas with the greatest disease burden. The versatility of GIS supports the exploration of spatial relationships, patterns, and trends that otherwise would go unnoticed.

Prior to the Atlas development, there was no integrated data store or warehouse for HIV, Viral Hepatitis, STD, and TB data that could be used to meet the analytical and data dissemination needs of the National Center for HIV, Viral Hepatitis, STD, and TB Prevention (NCHHSTP). Limited data were available via CDC Wonder, but in a non-integrated fashion and without the appropriate level of cross-linking to Center web resources. NCHHSTP’s web sites provided static graphics via disease-specific annual surveillance publications. Those data sources were not adaptable or interactive or queryable.

So far this new tool has fulfilled the needs of many researchers, students, and public health professionals across the country and abroad. From its original release date in February 2012 until the re-launch with county data on September 2013, the site has had over 46,000 visits, with a daily average of approximately 80 visits. From the time county level data was released, the daily average has doubled. On behalf of NCHHSTP OD, I am pleased to submit the NCHHSTP Atlas project for URISA’s ESIG Award.

Sincerely,

[Signature]

Gustavo Aquino
Associate Director for Program Integration
National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention (NCHHSTP)
CDC
To:     URISA’s Exemplary Systems in Government Awards committee

From:  Jane Kelly, MD
        HIV/AIDS Epidemiology Program
        Georgia Department of Public Health

RE:    Exemplary Systems in Government Awards

At our request, a geospatial specialist from the Centers for Disease Control and Prevention gave an interactive presentation on the CDC NCHHSTP Atlas at the Georgia Department of Public Health on January 22, 2013. That presentation stimulated a discussion about user-friendly ways to depict data, and creating systems to offer data for decision-making in HIV prevention and care. I have to admit that I was not familiar with a lot of the functionality of the CDC Atlas. We were blown away by its many search features, display features and the ability to export and to look at new diagnoses and multiple years. We were happy to see county level data being included and are looking forward to advanced querying functionality and the updated data. The CDC Atlas is great! Easy to use, easy to understand, and a valuable resource. In collaboration with the Georgia Care and Prevention in the US (CAPUS) team, we have introduced the CDC Atlas to the Metro Atlanta Testing and Linkage Consortium (MATLC), a group representing over 30 community-based and clinical organizations in the Atlanta area. The mapping features were considered highly desirable and useful in planning their activities of HIV outreach for prevention, testing and linkage to care. We're planning on re-vamping the GA HIV webpages and we will definitely link to the Atlas.

I think the CDC Atlas is indeed a model example of an Exemplary System in Government. Please contact me by e mail if I can offer any further information. Thanks

Sincerely,

Jane Kelly, MD
Director, HIV/AIDS Surveillance Section
GA Department of Public Health    jkelly@dhr.state.ga.us
March 24, 2014

Dear CDC Atlas Team:

In my work as the Program Analyst for the Indian Health Service, I routinely use the CDC NCHHSTP Atlas to create charts, one-pagers, and memos. I access the webpage frequently and recommend its use to others in the field. I have found the state-level information especially useful, as such granular reports are not readily available to me otherwise.

Your work has been invaluable in supporting the efforts of the Indian Health Service in drawing attention to the health disparities found in the population we serve. Thank you.

Best wishes,

Lisa C. Neel, MPH
Program Analyst
National HIV/AIDS Program
Indian Health Service
The NCHSTP Atlas has functionality and attention to details that set it apart from most other online disease atlases. The functionality that adds to its value includes providing the data at both the state and county level, the ability to display the data as cases or rates, the ability to select the classification scheme, and number of classes. The query function is easy to use and offers extensive options to query on. The ease with which you can switch from state to county level data and view rates or cases is useful in identifying areas to investigate further. The atlas also offers the option to select a country and get more in-depth information about that county. Finally, the data export function that allows either export of the data for further analysis or the graphics for use in presentations or reports is a great service to users. The atlas provides information about the data and assistance in how to use it. The attention to detail is seen in allowing users to select a color scheme and providing the ability to display the data in graphs or tables to supplement the data on the map.